

ABSTRACT OF THE DISCLOSURE

[0069] A positive displacement pump includes a magnetostrictive actuator. A single actuator drives multiple pumping chambers. The pump may include two pumping chambers driven in phase by the linear expansion of the actuator at both its ends. The pump may include a third pumping cavity, driven by the transverse expansion and contraction of the actuator, out of phase with either cavity driven by the lengthwise extension of the actuator.

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10 A pump assembly having multiple pumps each including a magnetostrictive element is also disclosed.